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FROM CLAIMS TO ACTIONS: HOW GREEN MARKETING SHAPES SUSTAINABLE TOURIST BEHAVIOUR

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Abstract

This study examines how green marketing influences sustainable tourist behaviour by identifying the mediating roles of perceived green business practices (PGBP) and environmental knowledge (EK). Drawing on the Theory of Planned Behaviour and Social Practice Theory, survey data from 1,037 tourists in Langkawi, Malaysia were analysed using PROCESS Model 4 parallel mediation with HC3 heteroskedasticity-consistent standard errors and 5,000 bootstrap resamples. The direct effect of green marketing on sustainable tourist behaviour becomes non-significant once mediators are included, whereas indirect effects through PGBP and EK are both significant. PGBP represents the larger indirect pathway, while environmental knowledge provides a complementary mechanism by strengthening tourists' ability to interpret sustainability cues and enact responsible practices. These findings suggest that aligning sustainability communication with verifiable green practices and embedding knowledge-building interventions throughout the tourist journey may help translate claims into action. Causal inference should be reserved for experimental or longitudinal designs.

Keywords: Green Marketing, Sustainable Tourist Behaviour, Environmental Knowledge, Perceived Green Business Practices, Theory of Planned Behaviour, Social Practice Theory

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INTRODUCTION

Tourism is increasingly scrutinised for its environmental impacts, yet it also offers a pathway to promote sustainable lifestyles through tourists' actions. Sustainable tourist behaviour such as waste reduction, energy conservation, low-carbon mobility, and support for environmentally responsible firms has therefore become a central destination management outcome (Bhagat & Chauhan, 2021; Vicente, 2024; Colasante et al., 2024). In this context, marketing and communication are expected not only to promote destinations but also to be associated with tourists' behaviours compatible with environmental limits and long-term resilience (de Araújo et al., 2025; Mohd Esa & Ismail, 2026).

Green marketing through environmental claims, eco-brands, eco-labels, certification schemes, and sustainability campaigns aims to communicate "green" attributes and encourage responsible consumption (Peattie & Crane, 2005; Leonidou & Skarmas, 2017; Yildiz et al., 2024). While it can support sustainable choices and patronage of responsible businesses (Han et al., 2010; Grimmer & Woolley, 2014; Chang et al., 2025), evidence shows the direct effect of green marketing on actual behaviour is often weak or inconsistent (Yadav & Pathak, 2017; Sharma, 2021; Škatarić et al., 2021; Thongmun et al., 2025). Recent work suggests green marketing operates mainly through mechanisms that translate messages into action, including credibility and capability-building processes (Chang et al., 2025; Nguyen et al., 2025; Zheng et al., 2025).

Two mechanisms dominate this translation. First, environmental knowledge reflects eco-literacy and understanding of sustainability issues and practices; it shapes attitudes, perceived behavioural control, and values, and is associated with greener choices and willingness to pay for sustainable options (Bhagat & Chauhan, 2021; Jiang et al., 2025; Alashiq & Aljuhmani, 2025; Shrivastava & Gautam, 2024; Shimul et al., 2024; de Araújo et al., 2025). Second, PGBP captures visible sustainability practices including credible eco-certifications, transparent reporting, and operational policies that signal commitment, reduce perceived risk, and strengthen trust in green claims (Font & McCabe, 2017; Martínez et al., 2019; Yildiz et al., 2024; Chang et al., 2025). Although these pathways are frequently discussed, studies often test them separately or focus on single tools and mediators, leaving limited evidence on their comparative roles, particularly in emerging markets such as Malaysia (Qiu et al., 2025; Elshaer et al., 2025).

These evidence gaps matter particularly for planning contexts in Langkawi, a designated UNESCO World Geopark and major Malaysian island destination where tourism growth, conservation standards, and green consumption must be managed together (Mohd Esa & Ismail, 2026; Rijal et al., 2025). Understanding whether green marketing works through perceived green business practices and environmental knowledge can inform destination

planning, eco-certification, visitor management, and green business communication. To address these gaps, this study integrates the Theory of Planned Behaviour and Social Practice Theory to examine a dual-pathway model in which green marketing is associated with sustainable tourist behaviour indirectly through perceived green business practices and environmental knowledge (Ajzen, 1991; Shove et al., 2012; Liu et al., 2020). Using survey data from 1,037 tourists in Langkawi, Malaysia, and PROCESS-based parallel mediation with HC3 standard errors (Hayes, 2017), the study asks: (1) How does green marketing influence sustainable tourist behaviour? (2) To what extent do perceived green business practices and environmental knowledge transmit this relationship? and (3) Which indirect pathway is larger?

LITERATURE REVIEW

Green marketing and sustainable tourist behaviour

Within a Theory of Planned Behaviour (TPB) framework, green marketing is expected to shape sustainable tourist behaviour by influencing attitudes towards eco-friendly practices, perceptions of social expectations, and perceived control (Ajzen, 1991; Han et al., 2010; Zhao et al., 2025). Tourism studies demonstrate that exposure to green marketing messages, eco-brands, and eco-labels can enhance eco-friendly attitudes, destination trust, and visit intentions for sustainable destinations (Chang et al., 2025; Hanafiah et al., 2025; Vicente, 2024). Although direct effects on actual behaviour are often modest, the total effect of green marketing on sustainable behaviour is generally positive when both direct and indirect pathways are considered (Alhomaidd, 2025; Zheng et al., 2025).

Accordingly, the present study posits that perceived green marketing efforts at the destination level will be positively associated with tourists' self-reported sustainable behaviours.

H1. Green marketing (GM) has a positive total effect on sustainable tourist behaviour (GC).

Mediation via perceived green business practices (PGBP)

Social Practice Theory and signalling perspectives highlight that marketing claims must be backed by credible, visible practices if they are to influence behaviour. Eco-certifications, operational policies, transparent reporting, and environmental investments function as signals of genuine commitment, reducing scepticism and reinforcing normative expectations around sustainable conduct (Font & McCabe, 2017; Yildiz et al., 2024). Empirical studies in hotels and destinations show that eco-labels and sustainability practices enhance customer trust, perceived value, and willingness to choose green options, frequently

mediating the relationship between green marketing exposure and behavioural responses (Chang et al., 2025; Alhomaïd, 2025).

In this study, PGBP is conceptualised as tourists' perceptions of the destination's and firms' sustainability practices. Green marketing is expected to strengthen these perceptions, which in turn promote sustainable behaviour by making sustainable options more visible, credible, and socially normative.

H2. Green marketing (GM) exerts an indirect effect on sustainable tourist behaviour (GC) through perceived green business practices (PGBP).

Mediation via environmental knowledge

Information-based mechanisms remain central within both TPB and broader environmental behaviour frameworks. Green marketing that educates through eco-guides, interpretive content, or micro-educational messages can enhance EK, which in turn supports pro-environmental attitudes, perceived control, and values (Bhagat & Chauhan, 2021; Jiang et al., 2025). In hospitality and tourism, EK has been found to mediate the relationship between sustainability cues and outcomes such as eco-resort intentions, green hotel patronage, and green purchase behaviour (Shrivastava & Gautam, 2024; Shimul et al., 2024; Muna et al., 2025). Studies grounded in value-belief-norm theory further show that EK influences eco-destination image and biospheric values, which subsequently drive support for sustainable tourism (Alashiq & Aljuhmani, 2025).

In line with this evidence, the present study posits that green marketing contributes to sustainable tourist behaviour partly by enhancing tourists' environmental knowledge, making them more aware of impacts, more capable of evaluating options and more motivated to act in environmentally responsible ways.

H3. Green marketing (GM) exerts an indirect effect on sustainable tourist behaviour (GC) through environmental knowledge (EK).

Comparative strength and complementarity of mediators

Although both PGBP and EK are expected to mediate the GM-GC relationship, prior work suggests their relative contribution may differ. Practice-based and signalling perspectives emphasise that credible business practices and eco-labels often exert strong effects on trust and choice, particularly when consumers are sceptical of green claims (Font & McCabe, 2017; Yildiz et al., 2024). Environmental knowledge enhances the interpretability and value of these signals, enabling tourists to understand and act upon them (Bhagat & Chauhan, 2021; Zheng et al., 2025). We therefore expect PGBP to account for a larger share of the mediated effect, while EK provides a complementary contribution.

H4. The magnitude of mediation via perceived green business practices (PGBP) is greater than the magnitude of mediation via environmental knowledge (EK).

Together, these hypotheses articulate a dual-pathway model in which green marketing shapes sustainable tourist behaviour indirectly through practice-based signals (perceived green business practices) and cognitive competences (environmental knowledge), grounded in an integrated TPB–SPT perspective.

Table 1: Theoretical Mapping of Constructs across TPB and SPT

Construct	Role in model	Theory linkage
GM	External communication cue shaping green attitudes and perceived expectations	TPB: attitude, subjective norm, perceived behavioural control
EK	Cognitive eco-literacy enabling interpretation of sustainability claims	TPB: perceived behavioural control; SPT: competence
PGBP	Visible green practices, eco-certifications, and operational sustainability signals	SPT: materials and meanings; credibility signalling
GC	Enacted sustainable tourist behaviour	TPB: behaviour; SPT: practice enactment

RESEARCH METHODOLOGY

Research Design

This study employed a quantitative, cross-sectional survey design to test the mediating roles of PGBP and EK in the relationship between GM and sustainable tourist behaviour (GC). This approach is appropriate for modelling relationships among latent constructs at a single point in time and for testing theoretically specified mediation paths in tourism settings.

Sample and Data Collection

Data were collected from January to August 2025 via structured intercept surveys at major tourism zones in Langkawi: Pantai Cenang (beach and commercial zone), Oriental Village, the Kilim Geoforest Park mangrove jetty area, and Langkawi Craft Cultural Complex. These zones represent high-traffic concentrations of domestic and international tourists across recreational, cultural, and nature-based experiences, and were selected to ensure diversity in visitor type and activity context. Trained enumerators approached adult visitors (aged 18 and above) in public areas and invited them to participate voluntarily. Eligibility required at least one overnight stay in Langkawi during the current trip. After removing incomplete or inconsistently answered questionnaires, 1,037 fully usable responses were retained for analysis.

A non-probability convenience sampling strategy was used, consistent with recent sustainable tourism studies that rely on on-site intercept samples due to access and cost constraints (Zheng, 2018; Gomes & Lopes, 2023; Alashiq &

Aljuhmani, 2025). In accordance with the research ethics guidelines of Universiti Utara Malaysia (UUM) and the Malaysian Ministry of Higher Education, formal institutional ethics board approval was not required for this study because: (1) the survey was anonymous and involved no personal identifying information; (2) participation was entirely voluntary; (3) participants were adults in public settings; and (4) the research posed no physical or psychological risk. Participants were informed of the study's purpose and their right to withdraw at any time.

Measures

The questionnaire comprised four sections (A–D), each with 10 items on a five-point Likert scale (1 = strongly disagree, 5 = strongly agree). GM functions as the external stimulus activating attitudes and subjective norms (TPB) and as a communication cue shaping practices (SPT). EK reflects perceived behavioural control and cognitive competence. PGBP captures material and symbolic sustainability signals observable at the destination. GC represents the enacted behaviour outcome. Items were adapted from established scales (Han et al., 2010; Olya et al., 2019; Nekmahmud & Fekete-Farkas, 2020) and updated to reflect recent operationalisations (Alhomaidd, 2025; Jiang et al., 2025; Dodds & Holmes, 2025). One weak item per construct was removed after diagnostic checks, yielding nine retained items per construct.

Table 2: Questionnaire Constructs and Retained Items

Construct	Item focus	Retained items
Green Marketing (GM)	Eco-label attention, branding, credibility, and message framing	9
Environmental Knowledge (EK)	Awareness, literacy, and ability to interpret sustainability practices	9
Perceived Green Business Practices (PGBP)	Eco-certification, sustainable operations, and transparency of tourism providers	9
Sustainable Tourist Behaviour (GC)	Recycling, reduced plastic use, conservation activities, and support for green enterprises	9

Note. One weak item from each construct was excluded based on corrected item-total correlation, alpha-if-item-deleted, and factor loading criteria.

Measurement model

Measurement quality was assessed using SPSS-based reliability analysis and exploratory factor diagnostics. Cronbach's alpha, corrected item-total correlations, and alpha-if-item-deleted statistics were examined.

Table 3: Reliability and Exploratory Factor Diagnostics

Construct	Items retained	Cronbach's α	Standardised α	Interpretation
GM	9	.804	.802	Acceptable
EK	9	.873	.873	Strong
GC	9	.857	.855	Strong
PGBP	9	.858	.852	Strong

Note. One item per construct was excluded based on CITC, alpha-if-item-deleted, and factor loading criteria.

The refined measurement structure retained nine items per construct. Cronbach's alpha ranged from .804 to .873, while standardised alpha ranged from .802 to .873, indicating acceptable to strong internal consistency. The overall retained measurement set also demonstrated strong sampling adequacy and factorability, KMO = .946, Bartlett's test of sphericity, $\chi^2(630) = 26,949.705$, $p < .001$. The retained factor loading ranges further supported the exploratory measurement structure. Therefore, the constructs were considered suitable for subsequent correlation and mediation analyses (Table 3). Collinearity diagnostics confirmed that VIF values did not exceed 5.0 (Hair et al., 2020), and strong inter-construct correlations are consistent with the integrated TPB–SPT framework (Ajzen, 1991; Shove et al., 2012).

Analysis Techniques

Descriptive statistics and Pearson correlations were computed first. Mediation hypotheses were then tested using PROCESS macro (version 5.0) for SPSS, Model 4, with GM as the independent variable, PGBP and EK as parallel mediators, and GC as the dependent variable. Indirect effects were evaluated via non-parametric bootstrapping with 5,000 resamples and bias-corrected 95% confidence intervals (Hayes, 2017; Igartua & Hayes, 2021). HC3 heteroskedasticity-consistent standard errors were employed. Harman's single-factor test indicated the first unrotated factor accounted for 39.20% of total variance, suggesting common method bias is unlikely to fully explain the observed relationships. VIF values in the GC outcome model ranged from 2.7469 (PGBP) to 3.5361 (EK), all below the 5.0 benchmark (Hair et al., 2014).

ANALYSIS AND DISCUSSION

Descriptive Statistics and Correlations

Table 4 reports means and standard deviations for the constructs ($n = 1,037$). Mean scores ranged from 3.76 (GC) to 3.86 (PGBP), indicating generally positive perceptions across all constructs. All Pearson correlations were positive and significant (all $p < .001$), ranging from $r = .687$ (GM–GC) to $r = .836$ (GC–PGBP), confirming strong theoretical proximity consistent with the integrated TPB–SPT framework.

Table 4: Descriptive Statistics (n = 1,037)

Construct	Valid n	Mean	SD	Min	Max
GM	1,037	3.80	0.45	2.00	5.00
EK	1,037	3.83	0.55	1.75	5.00
GC	1,037	3.76	0.48	1.78	5.00
PGBP	1,037	3.86	0.52	1.00	5.00

Mediation Analysis

Table 5 presents the individual regression paths from PROCESS Model 4 together with collinearity diagnostics. GM significantly predicted both EK ($B = 0.9647$, $HC3\ SE = 0.0328$, $t = 29.45$, $p < .001$, 95% CI [0.9004, 1.0290]) and PGBP ($B = 0.8505$, $HC3\ SE = 0.0386$, $t = 22.03$, $p < .001$, 95% CI [0.7748, 0.9263]).

Table 5: PROCESS Model 4 Individual Regression Paths and Collinearity Diagnostics

Outcome	Predictor / Path	B	SE	t	p	95% CI	VIF
EK	GM to EK	0.9647	0.0328	29.45	< .001	[0.9004, 1.0290]	1.0000
PGBP	GM to PGBP	0.8505	0.0386	22.03	< .001	[0.7748, 0.9263]	1.0000
GC	GM to GC	0.0774	0.0656	1.18	.2378	[-0.0512, 0.2061]	3.1087
GC	EK to GC	0.1458	0.0617	2.36	.0183	[0.0247, 0.2668]	3.5361
GC	PGBP to GC	0.6049	0.0507	11.94	< .001	[0.5055, 0.7043]	2.7469

Note. Coefficients are unstandardised estimates (HC3 standard errors). VIF values for the GC outcome model ranged from 2.7469 to 3.5361, below the 5.0 benchmark, indicating no severe multicollinearity.

In the GC outcome model, both EK ($B = 0.1458$, $HC3\ SE = 0.0617$, $t = 2.36$, $p = .0183$) and PGBP ($B = 0.6049$, $HC3\ SE = 0.0507$, $t = 11.94$, $p < .001$) significantly predicted GC, while the direct effect of GM on GC was non-significant ($B = 0.0774$, $p = .2378$). VIF values were below 5.0, confirming no severe multicollinearity.

Table 6 presents the direct, total indirect, and total effects from the bootstrap analysis. The direct effect of GM on GC was non-significant after including both mediators ($B = 0.0774$, 95% CI [-0.0512, 0.2061]), indicating that the relationship operates primarily through indirect pathways and supporting the view that green messages rarely translate into pro-environmental actions without additional psychological or contextual mechanisms (Yadav & Pathak, 2017; Zheng et al., 2025; Hanafiah et al., 2025). Both indirect effects were statistically significant, as their bootstrap confidence intervals excluded zero. The pathway through PGBP was substantially larger ($B = 0.5145$, BC 95% CI [0.4252, 0.6022]) than the pathway through EK ($B = 0.1406$, BC 95% CI [0.0247,

0.2504]). This indicates that tourists' perceptions of eco-certifications, visible sustainable operations, and transparency of tourism providers play a particularly important role in transmitting the effect of green marketing to sustainable behaviour, consistent with studies showing that eco-labels and credible green practices foster trust and encourage green behavioural responses (Yildiz et al., 2024; Chang et al., 2025).

Table 6: Direct and Indirect Effects of GM on GC (PROCESS Model 4, $n = 1,037$)

Effect	Estimate	BootLLCI	BootULCI
Direct effect: GM to GC	0.0774	-0.0512	0.2061
Indirect via PGBP	0.5145	0.4252	0.6022
Indirect via EK	0.1406	0.0247	0.2504
Total indirect effect	0.6551	0.5551	0.7569
Total effect: GM to GC	0.7325	0.6853	0.7797

Note. Bootstrap estimates based on 5,000 resamples with bias-corrected 95% confidence intervals. LLCI = lower-limit confidence interval; ULCI = upper-limit confidence interval. A confidence interval that excludes zero indicates a significant indirect effect.

The significant indirect pathway via EK supports the view that green marketing also works by enhancing tourists' environmental literacy, which in turn promotes pro-environmental actions (Bhagat & Chauhan, 2021; Jiang et al., 2025; Alashiq & Aljuhmani, 2025). The total indirect effect ($B = 0.6551$, BC 95% CI [0.5551, 0.7569]) and total effect ($B = 0.7325$, BC 95% CI [0.6853, 0.7797]) confirm that green marketing is meaningfully related to sustainable behaviour when both direct and mediated components are considered.

Overall, these results support H1, H2, and H3. In line with H4, the indirect effect via PGBP ($B = 0.5145$) was descriptively larger than the indirect effect via EK ($B = 0.1406$), echoing evidence from hospitality and destination studies in which credible business practices often emerge as particularly powerful drivers of tourists' green responses (Font & McCabe, 2017; Elshaer et al., 2025). The significant contribution of EK underscores its complementary role in equipping tourists with the cognitive resources needed to interpret and act upon sustainability signals (Muna et al., 2025; de Araújo et al., 2025).

DISCUSSION

This study finds that the association between green marketing and sustainable tourist behaviour becomes non-significant once PGBP and EK are introduced as mediators, indicating the relationship operates primarily through indirect pathways. Because the design is cross-sectional and relies on self-reported behaviour, no causal claims are made; the findings describe patterns of association consistent with the theoretical model. This pattern supports the view that tourism sustainability messages rarely translate into action through persuasion alone; behavioural change tends to occur when marketing is

embedded in credible organisational practice and supported by eco-literacy (Font & McCabe, 2017; Liu et al., 2020; Zheng et al., 2025). In TPB terms, green marketing may not directly move behaviour unless tourists also perceive feasibility and legitimacy for acting sustainably in-destination (Ajzen, 1991; Han et al., 2010).

The stronger mediation through PGBP highlights the central role of visible sustainability practices and signals. Eco-certifications, transparent operations, and demonstrable green innovations act as credibility cues that reduce scepticism and provide normative guidance for tourists (Font & McCabe, 2017; Yildiz et al., 2024; Chang et al., 2025). This result is consistent with evidence that eco-labels and credible practices strengthen trust and green behavioural responses in hospitality and destination contexts (Martínez et al., 2019; Alhomaidd, 2025). Environmental knowledge significantly transmits the effect of green marketing as well, supporting research showing that eco-literacy enhances tourists' ability to interpret sustainability cues and undertake responsible actions (Bhagat & Chauhan, 2021; Jiang et al., 2025; Rijal et al., 2025; Shrivastava & Gautam, 2024; Shimul et al., 2024). From an SPT perspective, knowledge functions as a competence resource enabling enactment, while PGBP reflects material and symbolic arrangements that make responsible behaviour easier and more meaningful (Shove et al., 2012). Taken together, the findings provide empirical support for integrating TPB and SPT: green marketing contributes to sustainable behaviour when it both strengthens competence (EK) and is backed by credible practice arrangements (PGBP) (Ajzen, 1991; Shove et al., 2012; Liu et al., 2020).

CONCLUSION AND FUTURE RESEARCH

This study examined how green marketing is associated with sustainable tourist behaviour through PGBP and EK. Using survey data from 1,037 tourists in Langkawi, Malaysia, and PROCESS Model 4 parallel mediation with HC3 standard errors and 5,000 bootstrap resamples, the results show that the direct effect of GM on GC becomes non-significant once both mediators are included. Both indirect effects are significant, with PGBP ($B = 0.5145$) representing the larger indirect pathway and EK ($B = 0.1406$) providing a complementary mechanism. Green marketing is most strongly associated with sustainable behaviour when sustainability claims are supported by credible, visible business practices and when tourists possess sufficient eco-literacy, supporting an integrated TPB–SPT explanation (Ajzen, 1991; Shove et al., 2012).

The study contributes by demonstrating that green marketing operates primarily through mediated mechanisms, extending work that focuses on single pathways such as trust, green image, or warm glow (Nguyen et al., 2025; Qiu et al., 2025). By comparing PGBP and EK within one model, the study shows that

tourists require both visible business practices to validate green claims and sufficient knowledge to interpret and act upon them (Bhagat & Chauhan, 2021; Jiang et al., 2025; Yildiz et al., 2024; Chang et al., 2025). The findings carry differentiated implications across stakeholder groups. Destination managers and local authorities (e.g., Langkawi Development Authority) should incorporate PGBP and EK criteria into destination planning and visitor management frameworks. Green business licensing conditions could require recognised eco-certifications (e.g., Malaysia Responsible Tourism Standards, Green Key) as a condition for inclusion in official destination marketing materials and tourism concession renewals. Visitor information centres and geopark interpretation points can serve as structured EK-delivery channels at high-traffic entry and transit points (Rijal et al., 2025; Zhao et al., 2025). Tourism firms and hospitality operators should invest in third-party eco-certifications, transparent sustainability reporting, and in-property communication tools (e.g., QR-linked sustainability dashboards, eco-practice signage) to make green practices visible and credible to guests (Font & McCabe, 2017; Yildiz et al., 2024; Chang et al., 2025). For national and state tourism policy, embedding PGBP standards and EK interventions within Malaysia's National Tourism Policy 2020–2030 governance framework can align destination branding with accountability mechanisms that deter greenwashing (Font & McCabe, 2017; de Araújo et al., 2025).

Several limitations suggest future research directions. The cross-sectional design limits causal inference; longitudinal and experimental studies could test whether changes in eco-certification visibility or knowledge interventions produce durable behavioural effects (Liu et al., 2020; Zheng et al., 2025). Self-reported behaviour may be subject to social desirability bias, where respondents overstate their pro-environmental conduct; future studies could incorporate revealed behavioural indicators such as actual booking choices, opt-in programme participation records, or waste audit data to corroborate self-reports (Nguyen et al., 2025; Elshaer et al., 2025; Dodds & Holmes, 2025). The convenience sample from a single island destination also limits generalisability to other Malaysian destinations with different governance structures and visitor profiles. Comparative research across regions can test generalisability and identify context-specific differences in the relative strength of PGBP and EK (Vicente, 2024; Colasante et al., 2024; Alashiq & Aljuhmani, 2025). Digital technologies and AI-enabled nudges may further strengthen both pathways by increasing practice visibility and supporting eco-literacy at scale (Nguyen et al., 2025; Yu et al., 2025).

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DISCLOSURE STATEMENT

The authors report there are no competing interests to declare. This study did not require formal institutional ethics board approval because it involved an anonymous, minimal-risk questionnaire administered to adult tourists in public settings; no sensitive or personal identifying information was collected; participation was entirely voluntary; and the research posed no physical or psychological risk. These criteria are consistent with the ethics exemption guidelines of Universiti Utara Malaysia (UUM) and the Malaysian Ministry of Higher Education. Participants were informed of the study's purpose and their right to withdraw at any time without consequence.

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